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PERIODICALS.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE.

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Die Stabilität der Raumwerte auf der Netzhaut. By *Franz Hillebrand.*
Ueber ein optisches Paradoxon. (Second Article.) By *Franz Brentano.*
Litteraturbericht. (Hamburg and Leipsic: Leopold Voss.)

This second article, "On an Optical Paradox," is a rejoinder of Franz Brentano of Vienna to Th. Lipps. We gave an account of this interesting discussion in *The Monist*, Vol. III, No. 1, p. 153 et seqq. Professor Brentano insists on explaining the optical illusion concerning distances between two points, as seen in Fig. 1–3, by an overestimation of small and an underestimation of large angles. He complains of being misunderstood by Professor Lipps who substitutes "acute" for "small" and "obtuse" for "large"; for, says he, in comparisons both angles may be obtuse or both may be acute. Professor Brentano adds some more puzzling figures to prove his case; and, as in his first article, his propositions are ingenious and thought-stimulating; but his arguments do not suffice to convince us of the validity of his theory. We do not exactly intend to deny the general rule as to the overestimation of large and underestimation of small angles, but are inclined to believe that it will not serve as a sufficient explanation. We reproduce the most important figures devised by Brentano, and take the liberty of adding a few remarks and additional figures of our own.

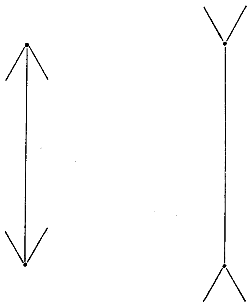

Fig. 1.

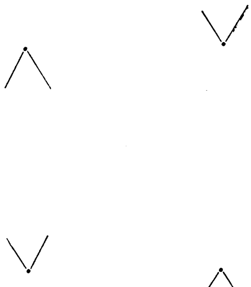

Fig. 2.

Fig. 4 represents two right angles, one of which is divided into nine angles of 10° each. Brentano claims that we so overestimate the nine small angles as to take the undivided right angle as an acute one. I can only say that however much I have tried, I am not subject to the illusion.

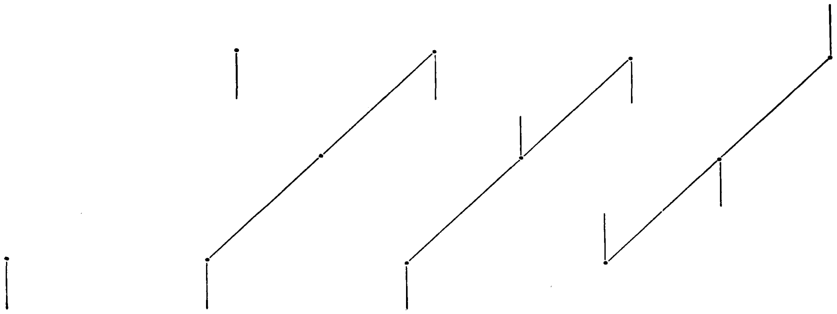

Fig. 3.

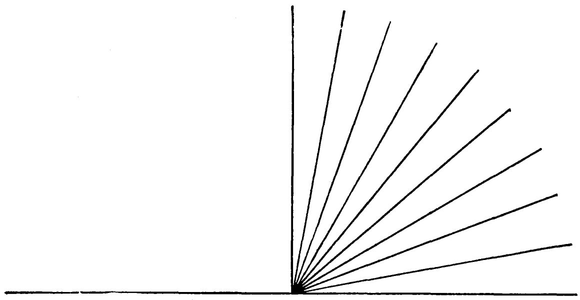

Fig. 4.

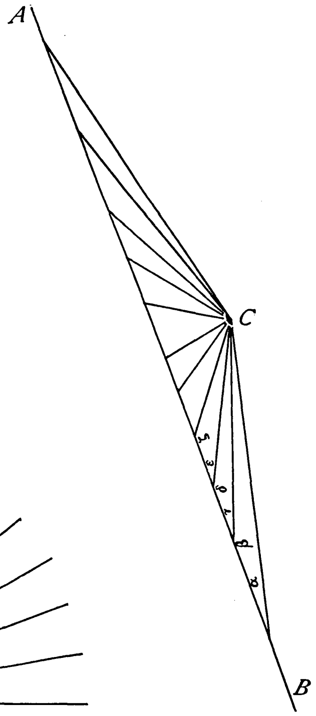

Fig. 5.

In Fig. 5 we have on the straight line AB a series of stations which are connected with a common centre. The line AB is not a curve, but this figure reminds us of a perspective view of the sector of a circle. The drawing appears as the diagrammatic picture of a shield, the buckle of which is in *C*. Thus *AB* is conceived as representing a curve. It does not seem that a comparison of the angles has anything to do with the illusion.

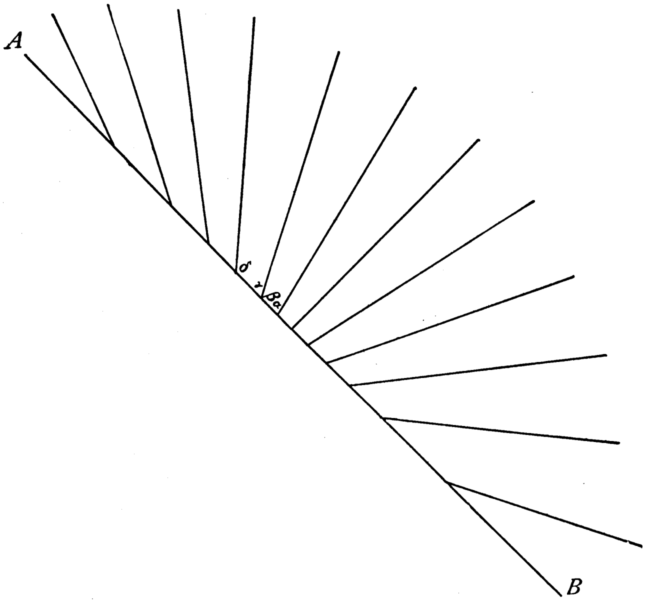

Fig. 6.

How much perspective interferes with the optical illusions under discussion, impresses itself upon my mind, when I think of figure 5 as the diagram of a mountain, rising above the plane *AB*. If I imagine I stand below the plane, which may be a high table-land, the line *AB* appears to my eye straight. But when I imagine

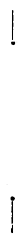

Fig. 7.

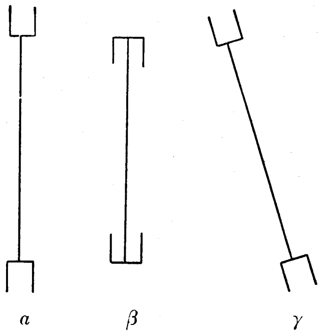

Fig. 8.

I am looking down upon the plane, the curvature of *AB* becomes very strongly marked.

In Fig. 6 we can detect no optical illusion. The line *AB* appears straight to us. The drawing reminds us of a sunrise on the ocean.

The same must be said about Figure 7. Brentano, in agreement with Lipps, claims that we are inclined to regard the distance between the ends of the two lines as larger than between the points. If there is any illusion at all, it seems to me, that on the contrary, the distance between the ends of the lines appears shorter. And why? We measure the distance by allowing our eyes to run from one point to the other and then comparing the measurements. This comparison is geometrically effected by combining the respective starting points, and thus judging as to the parallelism of these two lines mentally constructed. Whether or not the dots appear equidistant, depends upon the execution of all these operations. While directly measuring the distances between the points, we have an easier measurement where the lines are attached. The lines give to the points a certain vim; they almost appear to move with a velocity indicated by the length of the little lines, while the isolated dots present a very phlegmatic appearance.

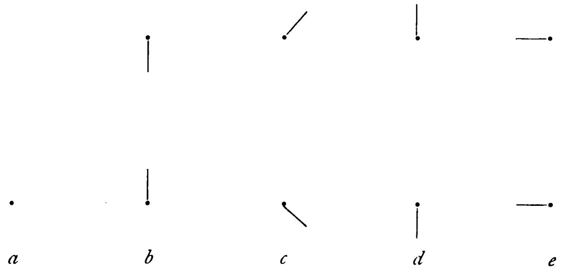

Fig. 9.

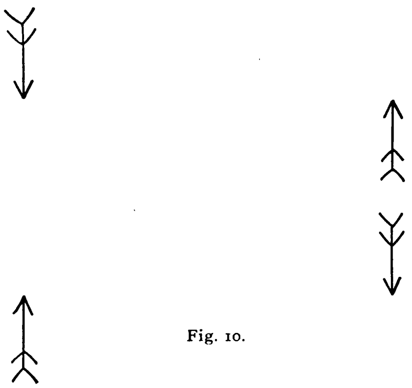

Fig. 10.

In order to see what effects other positions of the lines produce, let us compare in Fig. 9 the several relations by covering the rest. If there is any illusion as to *a* and *b*, we should say that the points of *a* appear at a greater distance; as to *b* and *c*, we see the greater distance in *c*, as to *c* and *d*, we feel doubtful, while any comparison with *e*, tends strongly to convince us of their equal distance. The reason is obvious. The lines in *e* assist us in drawing the parallels, which we consciously or unconsciously construct in order to compare the distances.

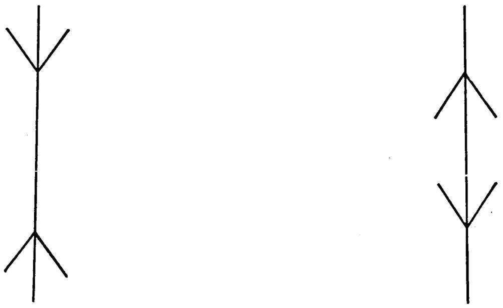

Fig. 11.

A comparison like that of α and β in Fig. 8, where the equal length of the combining lines is very apparent, induced Brentano to regard the illusion which is observed in Figures 1–3 as due to the angles. In our opinion he is mistaken. For the illusion actually takes place in α and β; only it is quickly corrected with the help of the parallels, which, as in e, assist the imagination in making an exact comparison. When we place α and β either at a sufficient distance, or are somehow prevented from making use of the parallel lines, we shall have the same illusion as appears in Figures 1, 2, 3. To prove this, we have but to bring the figure α in a slanting position, as is shown in γ, and the illusion is so strong that many will find it difficult to believe that γ is an electrotyped duplicate of α.

The mooted illusions are not sense-illusions, but illusions of judgment; and we believe that the explanation of these curious phenomena must be sought in the elements which unconsciously enter into the make-up of our judgments.

Lipps says that lines are felt to be movements. If a line is continued, albeit with a slight declination, the motion appears "free and victorious," aspiring beyond itself; while, if confined in the corner of an acute angle, it seems cut off and impeded. The victoriously progressive motion is overestimated; the checked motion is underestimated.

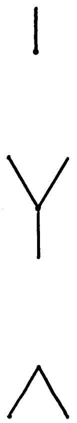

Fig. 12.

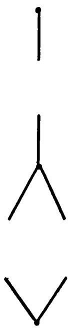

Fig. 13.

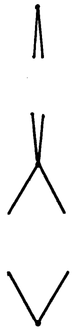

Fig. 14.

Brentano, in order to meet Lipps's objections, proposes a few additional figures, of which we reproduce the most important ones in Fig. 10–14.

It seems to us that the main part which the angles play in these or any other similar figures, consists in leading our imagination astray. The parallel lines which we attempt to construct for our comparison, switch slightly off with an inclination toward the angles.

But that is not all; there are other elements that affect our judgment at the very outset. In measuring a distance we do something, and in looking at a diagram we think something. The diagram is suggestive of some reality to which we compare it. All these ideas, be they conscious, sub-conscious, or even unconscious, affect our judgment and are sometimes apt to lead it astray.

In addition we have to mention two things, the influence of which upon our verdict cannot be doubted; the one is the size of the entire figure, the other the vacuity of the distance to be measured: both tend to make the distance appear longer than it really is. To illustrate this, we add the three Figures 15, 16, 17 which contain no angles and yet show the same illusions.

The distance between the points in Figure 17 appears longer than in Figure 16, and in Figure 16 again longer than in Figure 15. The fact is, that before starting on our measurement-journey, we have in Figure 17 already traversed a good distance after having noted the extraordinarily lengthened boundary marks. The town *A* may be exactly as far as the town *B*, yet the journey to *A* will appear longer, if I have to ride an hour before I reach the station, while I may live opposite the terminus of the railroad to *B*.

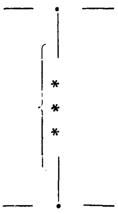

Fig. 15

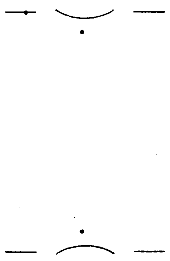

Fig. 16

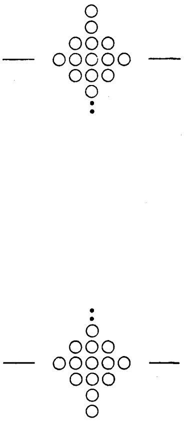

Fig. 17.

When our eyes glide down from one point to the other, we pass in one case through an empty desert the dreariness of which is not interrupted. We almost lose our way and become lonesome in its monotony. If our way, however, is full of variations, we are pleasantly entertained and regard our journey as so much shorter. The contrast is most obvious in figure 10. The time-illusions as to the swiftness of hours of work or amusement and the slowness of moments of *ennui* have become proverbial among all nations. The more dreariness, the more marked is the lengthening of the distance, while even a partial accompaniment shortens the traversed road.

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